Impact of Dynamic Community Partnerships on STEM Education of Students of Color:
Science-Bound Model

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EXECUTIVE SUMMARY

The Science Bound Model is an effective school-community partnership preparing precollege students of color to pursue college degrees and careers in STEM fields via a four-way partnership among school administrators and teachers, STEM corporations, students and families of color, and a land-grant university. For nearly 30 years, this partnership has been effective in bringing together the skill sets, resources, expertise, and opportunities necessary to support students' preparation for college and pursuit of technical degrees. The four-way partnership annually provides more than 400 students an average of 100 hours of out-of-school STEM learning experiences and mentorship by 50 teachers and 150 STEM professionals. Used in a rural community, a small city, and an urban community, the model establishes and maintains dynamic partnerships within and across partner groups. Five key factors that guide the four-way Science Bound partnership and a case example of how the model works are presented.

INTRODUCTION

In the midst of changing population demographics, the national need for science, technology, engineering and mathematics (STEM) professionals continues to grow (National Science Board, 2014). According to the National Science Foundation (2014), students of color[1] comprise more than 50 percent of the K12 students in U.S. public schools. Yet, African American, Latinx and Native children, who attend the same schools, with the same teachers and curricula as their white counterparts, experience significantly lower levels of academic achievement, high school completion, college enrollment, and college degree attainment (National Center for Science and Engineering Statistics, 2019; Smith & Garcia, 2018). These differences are even more dramatic in math and science performance and college readiness (U.S. Department of Education, 2016) even though a strong technical workforce is critical to the economic stability and vitality of the United States. The representation of African Americans, Latinx, and Native Americans in science and engineering continues to be less than their representation in the United States population (NCSES, 2019; National Science Foundation, 2015). In 2016, Latinx and African Americans together earned only 22 percent of bachelor's degrees awarded in science and engineering (NCSES, 2019). In 2016, African Americans represented only 7.7 percent and Latinx 8.6 percent of the full-time science and engineering workforce and yet they comprised 13 percent and 17.6 percent, respectively, of the overall workforce (NCSES, 2019).

This continued underrepresentation of people of color in the STEM education pipeline and workforce is a national grand challenge with significant implications for the nation's global competitiveness and economic stability (National Science and Technology Council, 2018). This grand challenge to increase racial diversity in STEM fields is flanked by two social realities: students of color comprise the majority of K12 students (National Center for Educational Statistics, 2014), and mainstream narratives define the math and science abilities of students of color as deficit in contrast to their white peers (Kohli, Pizarro, & Nevarez, 2017; Riley, Foster, & Serpell, 2015).

Preparing middle and high school students in STEM disciplines is a formidable challenge for schools, in part due to the resources and expertise needed to make STEM content accessible, interesting, and applicable to today's youth in general (LaForce, Noble, & Blackwell, 2017; Rogers, 2009), and youth of color specifically (Barton, Tan, & Greenberg, 2017; Bouillion & Gomez, 2001; Margolis, Estrella, Goode, Jellison Holme, & Nao, 2008). School-community partnerships play an important role in effective school systems as such partnerships expand the resources and enhance the ability of the school to prepare students to be engaged members of the larger community (Epstein et al., 2018). Thus, developing effective school-

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